REVIEW OF THE DRAFT RESOURCE CONSERVATION AND RECOVERY ACT

FACILITY INVESTIGATION AND CORRECTIVE MEASURES STUDY WORK PLAN

FOR THE 100-HR-1 OPERABLE UNIT

October 12, 1989

1. **Deficiency:** Table of Contents, p. iii

   Section 2.1.5, Unplanned Releases, beginning on p. WP-26, does not appear in the table of contents.

   Recommendation:

   Modify the table of contents to include Section 2.1.5.

2. **Deficiency:** Section 1.2, p. WP-3, first two paragraphs

   The text states the goal of this RFI to be, "provid(ing) sufficient information needed to conduct the CMS..." And further, "determinations will be carried out, to the extent necessary and sufficient, for the evaluation of corrective measure alternatives..." (emphasis added). This language could be interpreted to mean minimal effort will be exerted to meet regulatory requirements.

   Recommendation:

   Re-write these introductory paragraphs using the concepts presented in the last paragraph. Use an active voice, stressing the RFI is the mechanism for collecting and interpreting data for site and waste characterization. State that the primary objective of this effort is to make an initial assessment of any actions necessary to protect the public health and the environment; and to clean up releases of hazardous wastes at Hanford.

   In addition, emphasize this RCRA corrective action program will be used to define treatability testing necessary to evaluate the performance and cost of treatment technologies; and will support the design of selected remedies.

3. **Deficiency:** Section 1.2, p. WP-3, fourth paragraph

   Given the number of units requiring corrective action, there will likely be multiple cost-effective and appropriate corrective measures.

   Recommendation:

   Change text to the plural as necessary.
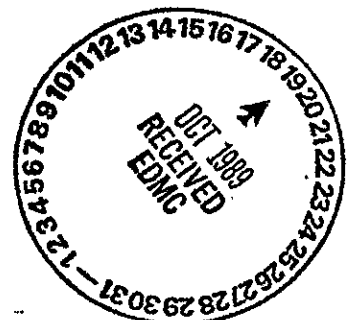
4. **Deficiency**: Section 1.3, p. WP-4, first paragraph

The most recent appropriate RCRA and CERCLA documentation should be cited.

Recommendation:

Reference the <u>Interim Final RCRA Facility Investigation Guidance</u>, EPA 530/SW-89-031, OSWER 9502.00-6D (May, 1989); and <u>Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA</u>, EPA/540/G-89/004, OSWER 9355.3-01 (October, 1988).

5. **Deficiency**: Section 1.3, p. WP-4, second paragraph

The text notes this work plan conforms, "in part", with 40 CFR 1500 et seq. What part? What are the objectives?

Recommendation:

Expand text to briefly inform the reader how NEPA requirements are being met.

6. **Deficiency**: Section 1.4, p. WP-6, first paragraph

Additional considerations of EPA guidelines applicable to specific investigations are cited, but there is no mention of applicable state requirements.

Recommendation:

Add "and Washington State Department of Ecology (Ecology)" after "EPA" and before "guidelines".

7. **Miscellaneous Comment**: Section 1.4, p. WP-6, second paragraph

In an expanded discussion, reference to the extent practicable, recent quality assurance documents in development, e.g., <u>Environmental Investigations and Site Characterization Manual</u> (WHC-CM-7-7), and the "Proposed Data Quality Strategy for Hanford Site Characterization".

8. **Miscellaneous Comment**: Section 2.1.1, Figure 5, p. WP-11

This is a good figure to include; why not produce at a larger scale in order to be more legible and useful?

9. **Deficiency**: Section 2.1.2, p. WP-12

Reference is made to WHC 1988d; however, this document is not listed in the Section 8.0 list of references.

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Recommendation:

The reference should be WHC 1988"b", rather than 1988"d".

10. **Deficiency:** Section 2.1.3.1.1, p. WP-12

The text states "...cooling water was held for a time in a retention basin to allow for thermal cooling and radioactive decay..."

Some indication of normal holding times would provide a better understanding of the extent of cooling and decay which may have occurred. Likewise, post-reactor water temperatures and radionuclide half-lives would provide more meaningful information.

Recommendation:

Provide such information with some indication of likely historical variations. Include cooling water use rate in gallons per minute, and basin volumes.

11. **Deficiency:** Section 2.1.4.1, Table 1, pp. WP-18 and 19

The 182-H unit shown in Figure 18 is not listed in this table.

Recommendation:

Provide the alias.

12. **Deficiency:** Section 2.1.4.1, Figure 6, p. WP-20

This figure, and Figure 18 are not in agreement with respect to the 182-H unit. It is not shown in Figure 6, but appears in Figure 18.

Recommendation:

Make correction as appropriate.

Provide Figure 6 with a scale, e.g. 1" = 150m.

13. **Deficiency:** Section 2.1.4.1.3, p. WP-22, second paragraph

In the discussion on fuel element rupture, it should be noted that in addition to the release of fission products, actinide fuel can also be released. This would include uranium and higher actinides such as plutonium and even americium depending on the extent of burn-up that has been achieved at the time of the rupture.

In contrast with rupture events, low-level quasi-continuous leakage can exist from the reactor fuel assembly.

3

Recommendation:

In this discussion, include the following information:

(i) The response time and sensitivity of the fuel failure detector.

(ii) How and with what sensitivity the reactor coolant water was monitored.

Both of these questions would address potential low-level fuel leaks to the reactor coolant that could have existed and gone undetected, i.e. a situation that would not constitute a fuel rupture event.

14. **Deficiency:** Section 2.1.4, p. 23-24

The depth of the different waste units is not always provided.

Recommendation:

If the depth of some of these units is unknown, it should be stated, with reference to when a future determination will be made.

15. **Deficiency:** Section 2.1.4.4.2, p. WP-25

The 182-H and 190-H units cannot be found in the WIDS database.

Recommendation:

Provide aliases, include in Table 1, and in WIDS.

16. **Miscellaneous Comment:** Section 2.1.4.5, p. WP-25, second paragraph

Change "was" to "were" in second line for correct tense.

17. **Miscellaneous Comment:** Section 2.1.4.5, p. WP-26

Update the physical status text for the 300 Area basins.

18. **Deficiency:** Section 2.1.5, p. WP-26

The statement, "There are no documented unplanned releases of wastes within 100-HR-1", is at odds with the statement found in Section 2.1.4.7, concerning the 116-H-2 trench overflow.

Recommendation:

Correct this discrepancy.

19. **Deficiency**:   Section 2.2.2, p. WP-28.

The reference shown in this paragraph does not appear in the references listed in Section 8.

Recommendation:

Change the reference number or add this to the references in the back if necessary. This reference and those that follow should show as that which will appear in the reference listing (i.e., WHC should be Westinghouse Hanford Company 1988x, etc).

20. **Deficiency**:   Figure 8, p. WP-30 .

The text refers to the uppermost sequence of the Saddle Mountains Basalt Formation as the Elephant Mountain Member and also refers to this figure. However, no label identifying the Elephant Mountain Member appears in the figure.

Recommendation:

For clarity, label the Elephant Mountain Member as such.

21. **Deficiency**:   Section 2.2.2.1, p. WP-31.

Same reference problems as listed in #1 above. DOE 1988 should have (a), (b) or (c). This reference is listed in references as U.S. Department of Energy.

Recommendation:

Change references to include DOE 1988(a), 1988(b) and 1988(c). Make changes in text or in references in Section 8.

22. **Deficiency**:   Section 2.2.2.1, p. WP-31, second paragraph

The text states that "No structural features such as fractures, faults, or folds were reported during drilling operations." In the previous paragraph, borehole samples from only one well are mentioned (Borehole #119-H4-15C). If the statement that "no structural features ... were reported" is based upon one borehole sampling, this should be clearly stated, in order to avoid overconfidence in this statement.

Recommendation:

Qualify the statement concerning structural features appropriately, and describe further investigations necessary to augment limited data.

23. **Deficiency:** Section 2.2.3.1 and subsections that follow, beginning on p. WP-36.

Bullets describe hydrostratigraphic units in descending order and yet the actual descriptions that follow are in ascending order.

Recommendation:

The presentation of information should be consistent. If you list in descending order, describe in descending order. However, it is more appropriate to describe in ascending order and therefore bullet listings should be in ascending order.

24. **Deficiency:** Section 2.2.3.1.5, p. WP-37, paragraph 5.

There is more recent data from Gee, and others, than is provided in this paragraph.

Recommendation:

Reference some of the more recent works by Gee such as Recharge at the Hanford Site: Status Report for 1987 and the later reports from 1989 (Gee et al. 1989).

25. **Deficiency:** Section 2.2.3.2, p. WP-38

The text refers to Figure 12, "Water Table Surface Contour Map". No explanation is given, however, as to why 10-foot contour intervals are used. Compare the much more useful 1-foot contours of Figures 13 through 15.

Recommendation:

If possible, provide 1-foot contour intervals for Figure 12 or explain why this is not possible and provide a schedule for completing such a contour map.

26. **Deficiency:** Section 2.2.4.2, p. WP-38, paragraph 1,

Locke Island is referenced in Figure 5, but not shown.

Recommendation:

Change text to reference Figure 7, or add Locke Island to Figure 5.

27. **Deficiency**:   Section 2.2.4.2, p. WP-43.

The 100 and 500 year floods are discussed and the contours that would be affected by these events. How would a dam breach compare to these events?

Recommendation:

Discuss the possibility of a dam breach and the effect on the 100-HR-1 operable unit. How does it compare to a 100 or 500 year flood?

28. **Deficiency**:   Section 2.2.5.2, p. WP-43.

The conversion for the 24°F temperature, -1.5°C is incorrect.

Recommendation:

Change the -1.5°C to -4.5°C.

29. **Deficiency**:   Section 2.2.6, Table 2, p. WP-47

No references can be found for the following citations: Hitchcock and Cronquist (1973); Washington State Department of Natural Resources (1987) and Washington State Department of Wildlife (1987).

Recommendation:

Provide the references.

30. **Deficiency**:   Section 2.2.6.4, p. WP-49

The discussion on land use completely ignores Native American historical and cultural uses, and early to mid-twentieth century agricultural and cultural land uses. These historical uses have potential to affect site characterization activities, and will be part of the dialogue concerning long-term land use at Hanford.

Recommendation:

Add text on historical and cultural uses, in this section and in Section 2.2.7.

31. **Deficiency:**   Section 2.2.7.2, p. WP-50

Within the boundaries of 100-HR-1, it is noted there are several documented locations of archeological significance. The work plan does not adequately explain how this issue will be addressed during the RFI/CMS.

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Recommendation:

Provide a more detailed discussion of archeological resources located within 100-HR-1, and describe what additional work is contemplated, and how new data, if any, will be factored into this RFI/CMS. Refer to the 100-HR-3 Work Plan as an example.

32. **Deficiency:** Section 2.1.4, p. WP-51

The radionuclide inventory of the 105-DR reactor building has been used to represent the inventory for the 105-H reactor building. Given that many activities can be reactor site specific, what justification exists for this qualitative assumption? Were the reactors similar or identical? Did the reactors experience similar operative power-time history?

Recommendation:

Answers these questions in an expanded text.

33. **Deficiency:** Table 3, p. WP-52

No indication of what isotope(s) of uranium are referenced in the table.

Recommendation:

Provide such information in the table.

34. **Deficiency:** Section 3.1.1.1.3, p. WP-53.

This section discusses the 107-H activity inventory of approx. 91 Ci. However, in Section 3.1.1.2, later in the work plan, there is a reference to 1000 to 2000 Ci of rad disposed to 107-H basin in 1955. Was this later removed to 116-H-1 trench? Is this the inventory as of today decayed to the present? What's the story?

Recommendation:

There should be some discussion addressing the possible discrepancy or explaining what happened at this basin. The 1000-2000 Ci is mentioned in the 116-H Reactor Exhaust Stack section.

35. **Deficiency:** Section 3.1.1.1.3, p. WP-53

The last sentence on the page states "The plutonium inventories for basin sludge,..."

Recommendation:

Clarify this sentence by indicating if this reference is to particular isotope(s) of plutonium.

36. **Deficiency**:   Table 5, p. WP-54

It is not clear why either a numerical value or an asterisk (*) does not appear in some of the table cells, e.g. Ni^{63} from As 4. Also there is no indication of what isotope(s) of uranium are referenced.

Recommendation:

Clarify why this information is not provided in the table and provide information on the isotopes if available or list as total uranium.

37. **Deficiency**:   Table 6, p. WP-55

Sample hole notations used in this table differ somewhat from those used in Table 5. It is not clear why either a numerical value or an asterisk (*) does not appear in some of the table cells, e.g. Ni^{63} from As. No indication of what isotope(s) of uranium are being referenced in the table.

Recommendation:

Provide uniform notation for consistency between the tables. Alternatively, discuss why notation should vary as it does. Clarify why information is not provided in the table and provide isotope(s) if available or list as total uranium.

38. **Deficiency**:   Table 7, p. WP-57

No indication of what isotope(s) of uranium are referenced in the table, and it is not clear why either a numerical value or an asterisk (*) does not appear in some of the table cells, e.g., Ni^{63} from Z-1.

Recommendation:

Provide such information in the table or list as total uranium.

39. **Miscellaneous Comment**:   Section 3.1.1.1.9, p. WP-61

This paragraph states that "There is no radionuclide inventory of the exhumed 105 Pluto Crib (116-H-4). However, the 116-F-4 crib was used for the same purpose and for approximately the same time period as the 116-H-4 crib."

Recommendation:

Summarize the tables. Note, at a minimum, these data indicate concentrations greater than background for plutonium$^{239/240}$, strontium^{90} and cesium^{137}.

44. **Deficiency:** Table 13, p. WP-66

"Casium-137" is listed as a parameter.

Recommendation:

Correct the typo and list as Cesium^{137}.

45. **Deficiency:** Section 3.1.2.2. to 3.1.4, WP-65 to 72

In Tables 13 through 18 it can be concluded that the uncertainty for background levels are statistical rather than systematic. For example, in Table 21 the Pu$^{238/240}$ concentrations at H-1 is listed as 0.000088 whereas background is listed as 0.00047 +/- 0.00049.

Recommendation:

Provide detection limits.

46. **Deficiency:** Tables 14, 15, 17 and 18, p. WP-67, 71, 72, and 79

No indication of what isotope(s) of uranium are referenced in the tables.

Recommendation:

Provide such information in the table, if appropriate. Otherwise, list as total uranium (U total).

47. **Deficiency:** Section 3.1.2.2.2, p. WP-70

Reference is made to Tables 17 and 18, which present radiological data for the soil columns beneath the 107-H effluent lines, but there is no discussion what these data indicate.

Recommendation:

Summarize the tables. Note, at a minimum, where data indicate concentrations greater than background for plutonium$^{238/239}$.

48. **Deficiency**: Section 3.1.3, p. WP-70

   Paragraph two states, "The known nature and extent of groundwater contamination in the vicinity of 100-HR-1 is discussed in greater detail in the 100-HR-3 Work Plan."

   The 100-HR-1 Work Plan should include all the known data concerning the nature, and extent, of groundwater contamination related specifically to this operable unit currently contained in the 100-HR-3 Work Plan. This plan should also include a description of how new data will be incorporated into work plan development and the final RFI.

   Recommendation

   Include all quality assured existing data concerning the nature and extent of groundwater contamination currently contained in the 100-HR-3 Work Plan, in this work plan.

49. **Deficiency**: Section 3.1.5.2, p. 73, last paragraph

   The cited reference, PNL 1988, also includes data for carbon-14 and ruthenium-106.

   This section states that no other air monitoring data, specific to the 100-H Area, is available other than that mentioned in the previous paragraphs of this section. However, in a previous section (Section 3.1.1.2) there was mention of a 1000-2000 Ci release from 116-H Reactor Exhaust Stack in 1955. Should this be included? If not, why not?

   While it is relevant to present the most recent(?) data for air emission within this operable unit, it would be far more useful for purposes of understanding contaminant sources, at a minimum, to present a summary of old (pre-1965) data, when discharges to the air were more of historical loading.

   Recommendation:

   Provide complete data whenever possible. Research, verify to the extent possible, or qualify as necessary, available historical data. For example, follow through with the discussion of the 116-H reactor exhaust emissions and describe how it could impact the 100-HR-1 Area.

   In additiona, there are off-site data, e.g., Berg Hill, Sage Hill and the Ringold area, that may prove useful.

50. **Deficiency**: Table 22, p. WP-79

   Providing standard deviations for very small numbers of samples, i.e., 3 or 9, is of questionable utility.

Recommendation:

Discuss in the text the limits of accuracy in utilizing small sample size, or delete them entirely.

51. **Deficiency:** Section 3.3.1.2, Figure 22, p. WP-84

Figure 22 should portray process effluent release through direct river discharge to river sediments as a potential primary exposure pathway. See Comment #54, below for further discussion.

Recommendation:

Modify Figure 22 to reflect the importance of process effluent releases to the Columbia River through direct discharges.

52. **Deficiency:** Section 3.3.1.5, p. WP-85

There is insufficient information presented to justify the conclusion that the "most critical exposure point in the aquatic environment is hyporheic fauna coming in contact with contaminated groundwater."

The description of potential receptors ignores fish that could come into contact with sediments, seeps, or contaminants in the surface water column. These fish could then by ingested by raptors such as the bald eagle. Another exposure route is shorebirds feeding on invertebrates in contaminated sediments. Shorebirds can bioaccumulate contaminates in critical organs, and can in turn be consumed by the peregrine falcon.

The 100-HR-3 Work Plan contains some data and discussion on aquatic/fauna exposure routes, but it too is deficient in data and development.

Recommendation:

Add more information to justify the conclusions.

Explore in greater detail potential exposure routes.

53. **Deficiency:** Section 3.3.1.5, p. WP-85.

The reference to Figure 20 should instead be Figure 22.

Recommendation:

Change "Figure 20" to "Figure 22".

54. **Deficiency:** Section 3.3.1.6, p. WP-86

This summary suggests that the only primary contaminant source pathway is groundwater discharge to the Columbia River. An equally important pathway is the past direct discharge of process effluents to the Columbia River from 100-HR-1. Many of the radionuclides identified in shoreline sediments are highly immobile in the Hanford groundwater environment without the presence of complexing agents.

Among the immobile constituents detected along the shoreline and in river sediments are cobalt[60], strontium[90], cesium[137], europium[152] and [154], and plutonium[238/239/240]. With the exception of strontium[90], none of these constituents are commonly detected in groundwater beneath 100-HR-1. Therefore, it appears these radionuclides have come from another pathway. Release of these radionuclides through direct discharge enables these highly sorbed constituents to be retained on river and shoreline sediments.

Recommendation:

Revise the summary to acknowledge the contribution of direct discharges to existing exposures through direct contact, biotic uptake, and surface water resuspension pathways.

55. **Miscellaneous Comment:** Section 3.3.2.2, p. WP-89, second paragraph

Typo on second line; "citrates" should be "nitrates".

56. **Miscellaneous Comment:** Section 3.3.2.4, p. WP-89

Under the discussion concerning mobility of metals, site-specific (Hanford-specific) considerations are presented in the last two sentences. Bring these important points up to the lead paragraph.

57. **Deficiency:** Section 3.3.2.6, p. WP-91

What is the value in presenting a list of contaminants with concentrations in groundwater exceeding unknown "background" levels by a factor of three? How was the "factor of three" derived?

Recommendation:

Present the rationale for the criterion. Better yet, cite and use statistical methods as defined in 40 CFR 264.97(h)(1)(i) for purposes of determining constituents to be on this list.

Qualify Hanford Site background levels as "assumed".

58. **Deficiency**: Section 3.3.3, p. WP-91

The text states that sampling of groundwater in the 100-H Area has never resulted in the detection of "semivolatile and nonvolatile organic compounds, and other constituents such as hydrazine". These compounds were omitted from Table 25 as contaminants of concern for the 100-HR-1 Operable Unit. The reasons for removal of these compounds from further investigations, in soils for example, based upon their absence in previous groundwater sampling, is not evident.

In addition, the use of herbicides and soil sterilants to limit biological instrusion at 100 Area wastes (Section 3.1.6.1) should warrant that these substances be considered contaminants of concern. If not, describe why.

Recommendation:

Provide discussion which clarifies the rational for ignoring such compounds in the 100-HR-1 Operable Unit.

59. **Miscellaneous Comment**: Section 3.3.4, Table 25, p. WP-89

Add "Operable Unit" to the title of this table.

60. **Miscellaneous Comment**: Section 3.4.2, Table 27, p. WP-95

Add footnote to the first "(indirect)" so the reader knows what this means. Tables and figures should be reasonable self-explanatory.

61. **Deficiency**: Section 1, p. WP-101, paragraph 2

While the conceptual approach of Section 4.0, "Work Plan Rationale" is appropriate, it must be more specific. It should be expanded to include an approximation of data uses, and data quantity. Data currently identified and collected should be more thoroughly identified.

Recommendation:

Some of the deficiencies of the data management section could be addressed in this section. Refer to the following recommendations and provide a summary of those responses in this section.

62. **Deficiency**: Section 4.1, p. WP-101, paragraphs 1 and 2

The sentence, "Data quality objectives (DQOs) are specific project data needs.", contradicts the sentence, "These needs are specified, to the extent practicable, to provide objectives...". The use and meaning of the words needs and objectives is obscured in these two sentences. If data quality objectives are project data needs, then it is nonsense to state that objectives are specified to provide objectives.

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See comments on the Data Management Plan for further discussion of these issues.

66. **Miscellaneous Comment**:   Section 4.1.1, Table 30, WP-104

Include the appropriate, specific citations as they appear in the literature.

67. **Deficiency**:   Section 4.1.2, p. WP-105 & 106

The information offered in this section is good, as far as it goes. However, Subsection 4.1.2.1 should be more completely developed. Subsection 4.1.2.3 should provide a similar level of detail, with the exception of the ongoing characterization of waste. Subsections 4.1.2.4 and 4.1.2.5 should provide some preliminary estimates of data requirements and analyses, if feasible.

Recommendation:

Develop Section 4.1.2.1 with an overall, summary description of data uses and analyses developed from Section 4.2.2, Section 5, and any other appropriate sections. If a sufficient quantity of data exists for a particular data type (as stated in Table 30), then a more complete summary of data uses for that type should be presented. Provide similar information in Subsection 4.1.2.3. and if appropriate, approximate data requirements for continuing characterizations of waste. If feasible, provide similar estimates of data requirements and analyses in Subsections 4.1.2.4 and 4.1.2.5. The recommendation of Section 4.1 deficiency concerning data analyses can be implemented here.

68. **Deficiency**:   Section 4.1.3, p. WP-106

The types of data needed for the RFI/CMS are not discussed in sufficient detail. Data categories which will reside in electronic media should be distinguished from other information, e.g. maps, graphs, and hard copy.

Recommendation:

Distinguish data types (categories) which will reside in electronic media and those that will found in maps, graphs, and hard copy. Table 30 identifies those data types for which sufficient information exists. References should be made to data dictionaries or equivalent documentation for those data types (categories). If documentation does not exist, please explain.

69. **Deficiency**:   Section 4.1.3.4, p. WP-107

The same deficiency exists regarding groundwater contamination data as is stated in Comment #48 concerning Section 3.1.3.

Recommendation

See Comment #48.

70. **Deficiency:** Section 4.1.4.4, p. WP-111

This section states that groundwater data will be gathered during the 100-HR-3 RFI. All existing, quality assured groundwater data relating to 100-HR-1 should be incorporated into the Phase I 100-HR-1 RFI Report. provided that RFI precedes the 100-HR-3 RFI.

Recommendation

Include all groundwater data relating specifically 100-HR-1 in this work plan, and incorporate new data during work plan development.

71. **Deficiency:** Section 4.1.3, p. WP-107 to 111

The quantity of data needed for the CMS is not adequately described. The information offered in this section is good, but needs to be further developed. For example, preliminary estimates of the minimal data quantities required for site characterization are not identified.

Recommendation:

Base estimates on minimum analysis requirements. Summarize the data quantity requirements by media and type. Table 30 identifies those data types for which sufficient information exists. The quantity of data for those data types should be closely estimated. The recommendation of the Section 4.1 deficiency concerning data quantity can be implemented here.

72. **Deficiency:** Section 4.1.4.4, p. WP-111

This section states that groundwater data will be gathered during the 100-HR-3 RFI. All existing, quality assured groundwater data relating to 100-HR-1 should be incorporated into the Phase I 100-HR-1 RFI Report.

Recommendation

Include all groundwater data relating specifically 100-HR-1 in this work plan, and incorporate new data during work plan development.

73. **Miscellaneous Comment:** Section 4.1.5 and Section 4.2 WP-112-117

These sections seem appropriate and well written.

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74. **Deficiency**:   Section 5.3, p. WP-121 to 141'

A general comment on the potential use of gamma-ray spectroscopy in operable unit characterization activities -

Given the established utility of gamma-ray spectroscopy for environmental measurements, it is surprising that this method is not mentioned in this work plan. Because of the general applicability of gamma-ray spectrometry, it can be used to supplement and extend both surface radiation source surveys as well as borehole field measurements for the soil medium.

Recommendation:

Gamma-ray spectroscopy would lie in the class of more sophisticated field analysis procedures, which has been defined as Level II, in Table 31 on page WP-113.

Three different gamma-ray spectrometers can be considered depending on the detector type, namely NaI, Ge or Si(Li). The general advantages/disadvantages of these three types of gamma-ray spectrometer are summarized in Table 1. With respect to surface radiation surveys, the gamma-ray spectrometer should be employed at any field grid point location where the surface radiation survey exceeds background by a 1 sigma criterion. Such field measurements would not only supplement the surface survey result in determining whether a reading above background arose, but would also identify the principal gamma contributing to the contamination.

In-situ gamma-ray spectrometry in boreholes would also permit the identification of radionuclides contributing to contamination below the surface of the soil medium. Because of the ability of the Si(Li) spectrometer to observe absolute gamma-ray flux, this particular spectrometer could be used for in-situ measurements of radionuclide concentrations. Such field measurements with an Si(Li) spectrometer would have the following advantages':

> (1) Independent/confirmatory observation of radionuclide concentrations in the soil medium.
>
> (2) A turn-around time of hours, rather than the 6-to-8 weeks required by laboratory soil sample analysis.
>
> (3) A determination of the representativeness of laboratory soil sample analyses.

_____

'The same advantages would accrue for in-situ Si(Li) spectrometry measurements in the groundwater medium.

With regard to the third advantage above, representativeness is defined on page SAP-54 and a vivid example is described on page WP-36. In the case of radionuclide concentrations determined by soil sample analyses in the laboratory, there is a concern that this procedure essentially constitutes a point measurement which does not sample a sufficient volume of soil. Given the anticipated circumstances, one cannot expect soil contaminants to be distributed uniformly or homogeneously in the soil.

Table 1

Comparison of Gamma-Ray Spectrometers

Detector Type	Advantages	Disadvantages
NaI	Highest efficiency.	Poorest energy resolution.
Ge	Best energy resolution.	Requires LN cooling.
Si(Li)	Determination of absolute gamma-ray flux.	Intermediate energy resolution; intermediate efficiency.

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Consequently laboratory analyses of soil samples, which are essentially point measurements, would not always be representative. In contrast, in-situ gamma-ray spectrometry would effectively integrate over a soil volume that depends on gamma-ray energy. The approximate dependence of this soil volume on gamma-ray energy is given in Table 2.

Table 2

Energy Dependence of Effective Soil Volume

Gamma-Ray Energy (MeV)	Effective Soil Volume[a] (cubic inches)
0.2	7.9
0.5	24.9
1.0	61.0
1.5	379.0
2.0	588.0

[a] The effective soil volume has been calculated from the gamma-ray total mean free path using a criterion that accounts for 86.5 percent of the peak gamma-ray intensity as observed in the in-situ gamma-ray spectrum.

75. **Deficiency:** Section 5.3.1.2, Subtask 1b, p. WP-123

Topographic mapping should also be used as a means to document archeological areas. These areas will likely require special consideration during other future sampling activities to minimize any disturbance to archeological resources.

Recommendation:

Revise this section to include mapping of archeological resource locations within 100-HR-1 and the surrounding environment.

76. **Deficiency:** Section 5.3.1.1.2, WP-123

With regard to developing the base map, how was third order surveying determined to be the appropriate level accuracy and precision? The Sampling and Analysis Plan, Section 2.2.2, does not provide this information.

Does this level of surveying suit the purposes at hand? What is the goal of establishing vertical control, e.g., are 2 ft. contours sufficient in such a "flat" area (see work plan, p. WP-127).

Recommendation:

Add text describing the rationale; explain why second order surveying is not more appropriate. Cite U.S.P.L.S. standards.

77. **Miscellaneous Comment:** Section 5.3.1.1.2, WP-123:

How will Subtask 1b, "Topographic Mapping", be coordinated with overall Geographic Information System development. Will it be coordinated within the Hanford Environmental Information System (HEIS)?

Will this information be digitized?

Recommendation:

Please answer these questions in an expanded text.

78. **Deficiency:** Section 5.3.1.1.2, WP-123, second paragraph

This map should, within reason, include all groundwater monitoring wells and other significant data points used for purposes of this investigation, not just those wells found within 100-HR-3.

Recommendation:

Include this information in description of the base map.

79. **Miscellaneous Comment:** Section 5.3.1.1.5, p. WP-125

Typo on first line; "...distances to be staked a(t) grade for subsequent..."

80. **Miscellaneous Comment:** Section 5.3.1.1.5, p. WP-125

The third paragraph of WP-125 describes the need for locational accuracy. GPS (geo-positional satellite) locational devices can be attached to moving objects and are capable of high locational accuracy. Has use of this instrument been explored?

81. **Deficiency:** Section 5.3.1.1.5, p. WP-125

Remote camera searching for cracks in the effluent pipe line is described. Pipes can leak even when there is no visual evidence that a crack exists.

85. **Deficiency**:   Section 5.3.1.3.2, Activity 3b-3, p. WP-128

It is stated that borehole sampling will consist of characterization of "contaminated soils associated with specific ...waste units."

This is in incorrect, and inconsistent with the text following on p. WP-129, first line, which references "potentially" contaminated soils as well.

Recommendation:

Delete "contaminated" in text on p. WP-128.

86. **Deficiency**:   Section 5.3.1.3.1, p. WP-129, first paragraph

The tasks planned for Activity 3b-3 and Subtask 1f appear out of sequence. Specifically, soil boring and sampling should occur <u>prior</u> to septic tank sludge and tile field sediment sampling. This is particulary true, if as planned, the 1607-H-2 and H-3 tanks are to be excavated with a backhoe.

The text on p. WP-132, "Event 3b-3L" is not adequate explanation.
Recommendation:

Shift planned activities to allow for careful soil sampling and analysis to take place prior to searching for, excavating and sampling the tanks and tile field(s). If not, please explain why.

87. **Deficiency**:   Section 5.3.1.5, p. WP-133

Little consistency exists between the level of effort for biological investigations for the 100-HR-1 and 100-HR-3 Work Plans. It appears that few significant populations of terrestrial or riparian species reside solely within the boundaries of 100-HR-1 or possibly even within 100-HR-3.

This suggests that terrestrial biological investigations will be difficult to fit into the confines of individual operable unit investigations. Nonetheless, biological investigations represent an important aspect in evaluating the potential environmental impacts within the 100 Area NPL aggregate and the adjacent segment of the Columbia River.

Recommendation:

Develop a consistent strategy for gathering terrestrial and riparian biological information within the 100-HR-1 and 100-HR-3 operable units as they extend into the 100 Area NPL aggregate. The objective of these sampling and population studies should be to verify previous data for radionuclides and to assess the presence of hazardous substances in this ecosystem.

88. **Deficiency**: Section 6.0, Figure 24, p. WP-160

There should be some degree of integration between this schedule and the
schedule for 100-HR-3.   The reader should be able to see how, and when ground
water data necessary to support the Phase 1 RFI Report for this operable unit
will be incorporated.

Recommendation:

Integrate this schedule and the 100-HR-3 schedule with respect to data
collection, analysis and site characterization.

89. **Miscellaneous Comment**:   Appendix b, p. WP-212, Table B-3

The word "biotic" is misspelled.

SAMPLING AND ANALYSIS PLAN

90. **Deficiency**: Table of Contents, p. SAP-v

The table of contents refers to p.s as FSP-X; however, the pages are labeled as SAP-X.

Recommendation:

Use a consistent page numbering approach.

91. **Deficiency**: Section 2.6.1.2, p. SAP-9

Access to sampling is described as potentially occurring "through any access ports encountered". Also, spatial configuration for three "representative" samples "will depend on available access". These statements are incongruous, depending on the definition of what is "representative".

Recommendation:

If the key criterion is access, this should be clearly stated. Additional steps to assure representative samples, within the confines of random access, should be defined.

92. **Deficiency**: Section 2.6.1 & Section 4.2, SAP Table 1, p. SAP-10

The extensive use of herbicides and soil sterilants to limit biological intrusion at 100 Area waste sites suggests that these substances should be considered contaminants of concern. In addition, previous investigations have identified PCBs as substances present in the environment. Herbicides and PCBs are analyzed by the same analytical method. The sources and extent of these substances in the 100-HR-1 source control operable unit is required.

Recommendation:

Revise Table 1 to include herbicides and PCBs. In addition, acknowledge their uses in biological intrusion control and reactor operations.

93. **Deficiency**: Section 4.1.1.1, p. SAP-11 and SAP-12

The background surface radiation survey is described, which includes 30 discrete samples in the 600 area (as shown in Figure 3). The location and frequency appear much too confined. There is a danger that a non-representative range of levels could be inferred.

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Recommendation:

Given the number of operable units in the 100 area, it would be prudent to
select many (say 10 or so) undisturbed areas along the entire periphery of the
100 area, including selected areas across the river. The use of thirty
samples in each such area would provide a proper statistical definition of the
range of natural background levels. These results could serve to help define
background surface radiation in the 100 area.

94. Deficiency: Section 4.1.1.4, p. SAP-12.

It is noted the equipment to be used to detect beta and gamma radiation will
be a truck-mounted NaI scintillation system. This will be adequate for gamma
radiation but may not realistically detect beta radiation even in dry weather.
How will this be taken into account during the survey?

Recommendation:

Some other contingency may be required to detect possible beta radiation other
than the truck-mounted NaI system. This should be discussed here.

95. Deficiency: Section 4.2.1, SAP-14

This section, Activity 3b-1--Background Soil Characterization Coordination
with 100-HR-3 states, "At least 30 discrete vadose zone samples from among at
least three boreholes drilled for upgradient (with respect to 100-HR-1) ground
water monitoring wells will be obtained for 100-HR-1 background soil
characterization. All sampling and analysis will be conducted under the 100-
HR-3 project."

The term "upgradient (with respect to 100-HR-1)" is vague and must be refined.
In addition, sampling and analysis activities for 100-HR-1 should be separate
and distinct from activities conducted under the 100-HR-3 project.

Recommendation:

It is reasonable to expect that "background soil characterization" may be
conducted offsite and upgradient of the Hanford Site. A determination of
"background soil characterization" on-site is premature, since there appear
few, if any, places on-site where soils have not been influenced by waste
disposal practices.

96. Deficiency: Section 4.1.2.4, p. SAP-14

It is stated that an elevated reading will be regarded as one that exceeds the
95th percentile of the background distribution. Given that a substantial
portion of the signal arises from sources below the soil surface (as opposed
to those sources exactly at the surface), this 95th percentile criterion is
too conservative.

Recommendation:

Rather than a 2 sigma criterion, it would be safer to use a 1 sigma criterion with the proviso that a second survey reading taken at the same location, but at a later time, also exceeds the 1 sigma criterion.

97. **Deficiency:** Section 4.2.3.2, pp. SAP-16 & 17

Given the history of disposal and the assumed quantities of liquid effluent discharged to the units cited, there is great potential for segregation and deposition of various substances. These significant units, particularly the 116-H-1 and 116-H-2 Trenches, require more than one soil boring in each unit, to ensure that samples are representative.

Recommendation:

Placement of three borings along the longitudinal distribution pipe at the inlet end, the center, and the foot of both of these trenches is required, as a minimum, to ensure that samples are representative and to determine the extent of contamination in these units. Similar sampling should be conducted along the length of the now demolished process effluent outfall structure (116-H-5).

98. **Miscellaneous Comment:** Section 4.2.3, pp. SAP-16 to 21

Please note the diameter of the boreholes, perhaps in Section 4.2.3.4.

99. **Deficiency:** Section 2.2, p. SAP-36.

It is intended that samples will be screened for radiation to determine the appropriate laboratory for analysis. The criteria is 200 counts/minute. Is this for gamma radiation? What instruments are to be used?

Recommendation:

The type of equipment to be used for survey should be specified and the type of radiation that will produce 200 counts/min in this detector.

100. **Deficiency:** Section 3.0, p. SAP-37, Level I paragraph.

It is stated that soil samples will undergo field screening for gross alpha, beta and gamma radiation. What instruments are going to give you 200 counts/min of not only gamma radiation but also beta and alpha non-penetrating radiation?

Recommendation:

It should be stated the screening is for gamma radiation. If pure beta or alpha emitters are present, it isn't likely they will contribute to the survey instrument's count rate. High-energy betas might be detected, however, lower energy betas and alpha radiations would be unlikely to penetrate the window of any survey instrument.

101. Deficiency: Table 1, p. SAP-38.

The last column of this table is incorrect, since Level I type of analysis is field screening and is not conducted by an "approved Westinghouse Hanford, participant contractor, or subcontractor laboratory".

Recommendation:

Change the "e" labels on the last column to reflect these are field screening activities.

102. Deficiency: Table 1, p. SAP-38

Iron is identified in the work plan (Table 25) as a contaminant of concern; however, information for iron is not provided in Table 1 of the SAP.

Recommendation:

Include information concerning iron in the table.

103. Deficiency: Section 5.2, p. SAP-45.

All soil samples are to be screened for alpha, beta and gamma radiation. Again, what type of instruments will be used?

Recommendation:

Instrumentation that will be used should be described in this section.

HEALTH AND SAFETY PLAN

104. <u>Deficiency</u>:   Section 4.1, p. HSP-5

In the third bulleted subsection, the word "routing" is used

<u>Recommendation</u>:

Change "routing" to "routine".

105. <u>Deficiency</u>:   Section 4.3.1, p. HSP-7.

Westinghouse Hanford radiation worker training seems to be a part of the OSHA 40 hr required training. Is this the case?

<u>Recommendation</u>:

The radiation training should probably be considered an extension of the 40 hr training, if it isn't already. There is probably enough that must be stuffed into the 40 hr course without also including the rad training. Other listed training topics that are considered a minimum by the authors of this Health and Safety Plan could also be considered as additional training. These include: vehicle training and use of drilling and sampling equipment.

106. <u>Deficiency</u>:   Section 4.3.1, p. HSP-8

The term "inexperienced employee" is not adequately defined.

<u>Recommendation</u>:

Provide a functional definition.

107. <u>Deficiency</u>:   Section 4.6, p. HSP-9.

In the first paragraph of this section there is a parathentical "(access to an exist)".

<u>Recommendation</u>:

Correct to "access to an exit".

108. <u>Deficiency</u>:   Section 4.7.2, p. HSP-12

Cold stress is not included in the third bullet as a condition that should be monitored.

Recommendation:

Modify the sentence to include cold stress.

109. **Deficiency:**   Section 4.10, p. HSP-16

Consideration of cold stress or hypothermia is not given in the health and safety plan.

Recommendation:

Provide a discussion of hypothermia adjacent to the existing heat stress discussion.

PROJECT MANAGEMENT PLAN

110. **Deficiency**: Séction 2.2, p. PMP-2

Subsection describing the responsibilities of the Community Relations Coordinator is missing.

Recommendation:

After the Health and Safety Officer subsection, add: "Community Relations Coordinator: The CR coordinator will be responsible for implementation of the CR plan. This includes preparing meeting summaries, press releases, fact sheets, and responsiveness summaries, as well as being the primary contact for local and other public organizations."

111. **Deficiency**: Section 2.2, p. PMP-3, paragraphs 4 & 5.

RCRA Facility Investigation Coordinator and Corrective Measures Study Coordinator are described in the text and are not included in Figure 1. One or the other is incorrect.

Recommendation:

Determine whether the text or Figure 1 is incorrect and rewrite one or the other.

DATA MANAGEMENT PLAN

Introduction

This data management plan is generally inadequate and its overall deficiencies include the following:

> Data types (categories), analyses, and related information from appropriate sections of the Work Plan are not summarized and presented well. These key subjects from the work plan are not well integrated in this data management plan.

> Cooperative work and communication between systems analysts and end users is not apparent. Coordination of long term planning and systems methodology with near-term needs and user requirements is not discussed.

> References to existing documentation and data elements relevant to this work plan are vague and in some cases contradictory. References and commitments to appropriate future systems documents are vague or not discussed.

> Various references for near-term data management needs to the Environmental Data Management Plan are contradictory since that Plan does not address these references, and specifically limits its purview to long term data management needs.

The introduction of the data management plan states that a comprehensive plan for the management of this extensive amount of data is essential, yet the plan does not demonstrate a comprehensive approach.

Although this plan does address the general procedural aspects of data management well, it fails to provide sufficient detail concerning environmental data collection and management in the near-term. While too much detail would be premature, and unnecessary, the lack of appropriate detail for a survey approach to data management is critical. Topics requiring more detail include minimum quantities of data likely to be generated, a summary of analyses likely to be employed, and a brief review of data currently collected concerning the 100-HR-3 RFI/CMS. For example, estimates of volumes and an overview of data analyses are not attempted. References to descriptions of database requirements are inadequate.

The data management plan fails to summarize data types, analyses, and volumes described in other sections of the Work Plan. References to the Westinghouse Environmental Data Management Plan, and the HEIS planning documents, are vague and "boiler-plated" rather than specific to context. To compound matters, references to developing preliminary user requirements are either non-existent or incorrect. These latter documents do not address near term data management needs.

This data management plan also has various positive aspects. Some of the results of various complex processes from other components of the 100 HR-1 Work Plan, e.g. Sampling and Analysis Plan, are presented in a brief and straight forward manner. Confidence and experience with quality control, field sampling, and other technical areas is obvious.

Recommendation:

To resolve ambiguity, present a common definition of "Near-Term Planning" and "Long-Term Planning", as these concepts relate to the 100-HR-1 Work Plan, the Westinghouse Environmental Data Management Plan, and the Hanford Environmental Information System development process.

Clarify the functions of information management as they relate to the planning efforts referenced above. This approach, together with a detailed response to the following comments should address the deficiency.

112. **Miscellaneous Comment:** Section 1, p. DMP-1, paragraph 1, second sentence

For brevity, it is recommended that this sentence be shortened to read, "The quality of the data is extremely important to the full remediation... etc."

113. **Miscellaneous Comment:** Section 1, p. DMP-1, paragraph 4, last sentence

For the correct tense, substitute the word "between" for the words "being developed by".

114. **Miscellaneous Comment:** Section 1, p. DMP-1

Generally, the procedures offered for controlling data seem good. The approach to computer based components needs more development.

Please refer to the following recommendations and provide a summary of those responses in this section.

115. **Deficiency:** Section 1, p. DMP-2, paragraphs 1-3

This section does not make references to a separate document offering a time commitment for describing user requirements relevant to the HR-1 Work Plan. Such references should be specific to page. Also, near-term user requirements are not addressed in the Environmental Data Management Plan nor are they addressed in the Hanford Environmental Information System Planning Documents.

Recommendation:

Develop appropriate time commitments for the development of user requirements relevant to 100-HR-1. If they exist as part of an overall system development effort, summarize these requirements in this section.

116. **Deficiency:** Section 1, p. DMP-2, paragraph 2

The phrase, "...integrated database designed to integrate...", is vague.

Recommendation:

Please rewrite to clarify.

117. **Deficiency:** Section 1.0, p. DMP-2, 1st bullet.

"inquires" should be "inquiries".

Recommendation: Change "inquires" to "inquiries".

118. **Deficiency:** Section 2, p. DMP-4, paragraph 3

In reference to the term "CAS numbers...", acronyms should be clearly defined when introduced and should be listed on page DMP-ii. This is especially important do to the heavy reliance on acronyms in this and other work plans.

Recommendation:

Clearly define acronyms when introduced and list them on page DMP-ii.

119. **Deficiency:** Section 2 , p. DMP-4,

In general, near term data management is not specifically addressed and all details are deferred to the long term. If a preliminary version of the Hanford environmental data dictionary/directory pertaining to the 100-HR-1 Work Plan exists, it should be referenced. At a minimum, the types (categories), of data, estimates of minimum volumes of data collected for a survey approach, and an overview of required analyses should be presented. References to commitments to a future user requirements statement should be made.

Recommendation:

Identify how specific data is being managed in the near term. If appropriate, identify the types of data currently being collected for this work plan, and provide references to a preliminary data dictionary.

Summarize the types of transactions which will take place in analyzing the data and other relevant information from Section 4 of the HR-1 Work Plan. Estimate volumes of the data resulting from these analyses.

Present an overview of the role of "collateral data", (ongoing Hanford Site Project Data), as it will be used in the RFI/CMS. Identify the categories of data, and summarize the data transactions.

Make additional and appropriate references to the development of a user requirements assessment document. See previous comments on Section 4 of the 100 HR-1 Work Plan for additional information.

120. **Deficiency**: Section 3, p. DMP-4, paragraph 1

The acronym HSP is not listed on page DMP-ii.

Recommendation:

Include the acronym.

121. **Deficiency**: Section 3, p. DMP-4, paragraph 1

Data management components of The Field Sampling Plan and the Quality Assurance Program Plan are strong and adequate. However, there is a gap between the general procedures of the Field Sampling Plan and the necessary details of getting information into the Data Management System. A data capture strategy has not been discussed.

Recommendation:

State when a data capture strategy for data elements will be developed or provide references to other parts of the HR-1 Work Plan. The strategy will use approximations and estimations as appropriate, but will provide an overview of how the data is to be captured to the system, especially concerning magnetic media.

Summarize the types of transactions which will take place in analyzing the data.

This section should summarize and coordinate relevant portions of the HR-1 Work Plan, the Field Sampling Plan, the Quality Assurance Project Plan, and the Health and Safety Plan as these plans pertain to data categories, quantities, analyses, and precision. In other words, it should, "pull it all together" and present summaries or relevant information from throughout the work plan.

122. **Deficiency**: Section 2, p. DMP-5, Table 1.

Table 1. is too general. Data volumes by category and overviews of required analyses should be included.

This table presents general categories to begin with in identifying records and data files required for recording groundwater samples, sediment samples, surface water samples, etc. References to data documentation for data currently being collected should be made. See Dept. of Energy [R. Freeberg] September 9, 1989 letter to P. Day and R. Stanley concerning notification of work activities for the 100-HR-1 and 100-HR-3 Operable Units.

Recommendation:

State the number of data elements within each category being collected. Summarize estimates of data type, volume, and required accuracy, if relevant. Identify cases where there is uncertainty if a data element will be included. References should be made to existing data dictionaries or equivalent documentation.

123. **Miscellaneous Comment**: Section 5, p. DMP-6, Table 2

This summary of existing data bases is useful and informative.

124. **Deficiency**: Section 6, p. DMP-10-13

This section is generally informative and useful as an overview. However, it should present more complete documentation of the existing data base systems. References should be page specific to the database documentation.

Recommendation:

Present more complete descriptions of the existing data base systems. References should be page specific to the database documentation.

125. **Miscellaneous Comment:** Section 6, p. DMP-10, paragraph 1, last sentence.

The word "paragraph" should be plural.

126. **Deficiency**: Section 6, p. DMP-12, 13, Table 3, paragraph 4.

The reference to the term "list of elements" is confusing, since "element" is commonly used for "attribute".

References to the HEIS are too general and do not provide a time line for handling information currently being collected.

Recommendation:

Please clarify and provide specific information.

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127. **Deficiency**: Section 6.0, p. DMP-13, last paragraph.

The last paragraph states that the <u>Environmental Data Management Plan</u> to be prepared by March 31, 1989 will address the needs of data not currently being stored in a data base. Does this mean this document is available now?

This statement is also in direct contradiction with the stated purpose of the <u>Environmental Information Management Plan</u>, WHC-EP-0219, (March 1989), Section 7, p.50, "...immediate needs of current programs and projects are not addressed. For example, data management requirements are identified in environmental restoration plans now in preparation. A scientific/technical data management group is working in parallel with the RLRP group to meet near term environmental restoration requirements. Longer term needs are included in the scope of this plan."

The Environmental Data Management Plan does not address these stated needs and was not intended to. Appendix A, Section 2.0 Requirements Analysis, Part 2, could be relevant, except that the Environmental Data Management Plan specifically limits itself to the long term and not to immediate needs of data management.

Concerning this section in general, there is no satisfactory explanation of how data will be managed in the near-term. Despite previous references to the Environmental Data Management Plan, it is not clear how near-term data management will be accomplished.

An apparent gap in coordination exists between near term user needs and long term systems development.

Recommendation:

Provide current information.

Improve coordination with the scientific/technical data management group and the Requirements and Long Range Planning Group.

Describe the entities of Table 1. as data categories instead of elements.

Provide information in Table 3 consistent with data categories of Section 4, of the 100-HR-1 Work Plan. Explain where site characterization data fits in this table.

Explain when the near-term user requirements assessment relevant to HR-1 will be developed.

Provide specific references to a relevant timetable for managing and capturing site characterization data to the HEIS Hanford Environmental Information System.

Provide specific references to a relevant timetable for other significant systems development events impacting the 100 HR-1 Work Plan.

128. **Miscellaneous Comment:** Section 6, p. DMP-12, paragraph 4

More information needs to be provided in Table 3, P. DMP-14. What is the time frame proposed to develop written procedures for Congressional Inquires and Hearings? This table is acceptable as a general overview of file categories and strategies of meeting specific report needs. Note that the WIDS and HISS is generally considered to be the same data base.

129. **Deficiency:** Table 3, pp. DMP-14 to -16.

The title repeats "Hanford" several times.

Recommendation:

Remove one "Hanford" from each page.

130. **Miscellaneous Comment:** Section 6, Page DMP-15:

The word Graphic should be changed to Geographic.

Strike the words, "... will be used to contain the and...", from the last paragraph of the last sentence of p. DMP-15.